

CLAIMS:

1. A method for manufacturing a semiconductor device having a buried conductive layer which is connected to one of a source and a drain of a MOS transistor and extends over a gate electrode of said MOS transistor, said method comprising the steps of:

forming a first insulating film on a semiconductor substrate;

forming a first conductive film as said gate electrode and a second insulating film on said first insulating film;

forming a third insulating film on the whole surface of said semiconductor substrate having said first insulating film, said first conductive film and said second insulating film formed thereon;

selectively etching away said third insulating film so as to form a side wall insulating film including said third insulating film on each of both side faces of said first conductive film and said second insulating film and also to expose said semiconductor substrate in portions which are not covered with said side wall insulating film and not covered with said first conductive film;

diffusing impurities into said exposed portions of said semiconductor substrate so as to form a source and a drain in said semiconductor substrate;

forming a second conductive film to be a part of said buried conductive layer on the whole surface of

said semiconductor substrate having said first insulating film, said first conductive film, said second insulating film and said side wall insulating film formed thereon;

forming a first mask layer on said second conductive film;

processing said first mask layer to have a pattern which is separated into both side portions as to said first conductive film;

forming a second mask layer on the whole surface of said semiconductor substrate having said first insulating film, said first conductive film, said second insulating film, said side wall insulating film, said second conductive film and said first mask layer formed thereon;

selectively etching away said second mask layer so as to leave a pattern of said second mask layer on each of both side faces of the pattern of said first mask layer; and

selectively etching away said second conductive film with the patterns of said first and second mask layers as a mask so as to process said second conductive film into a pattern in which said second conductive film is separated on said second insulating film.

2. A method for manufacturing a semiconductor device according to claim 1, wherein said first mask layer is formed of an insulating film, and said second

mask layer is formed of a conductive film.

3. A method for manufacturing a semiconductor device according to claim 1, wherein each of said first and second mask layers is formed of an insulating film.

4. A method for manufacturing a semiconductor device according to claim 1, wherein said first mask layer is formed of a conductive film, and said second mask layer is formed of an insulating film.

5. A method for manufacturing a semiconductor device according to claim 1, wherein each of said first and second mask layers is formed of a conductive film.

6. A method for manufacturing a semiconductor device according to claim 1, further comprising the steps of:

forming, after said step of selectively etching away said second conductive film, an interlayer insulating film on the whole surface of said semiconductor substrate having said first insulating film, said first conductive film, said second insulating film, said side wall insulating film, said second conductive film, and said first and second mask layers formed thereon;

forming a contact hole through both said interlayer insulating film and said first mask layer so that said contact hole reaches said second conductive film; and

forming a wiring layer which is connected to said second conductive film at the bottom of said

contact hole.

7. A method for manufacturing a semiconductor device according to claim 1, further comprising the steps of:

forming, after said step of selectively etching away said second conductive film, a fourth insulating film on the whole surface of said semiconductor substrate having said first insulating film, said first conductive film, said second insulating film, said side wall insulating film, said second conductive film, and said first and second mask layers formed thereon;

forming a contact hole through both said fourth insulating film and said first mask layer so that said contact hole reaches said second conductive film;

forming a third conductive film in the inside of said contact hole so that said third conductive film reaches said second conductive film;

processing said third conductive film into an electrode pattern;

coating a surface of said third conductive film, which has been processed into the electrode pattern, with a dielectric film;

forming a fourth conductive film on said dielectric film; and

processing said fourth conductive film into an electrode pattern.

8. A method for manufacturing a semiconductor device according to claim 1, further comprising the steps of:

removing said first mask layer after said step of selectively etching away said second conductive film;

coating at least a surface of said second conductive film with a dielectric film;

forming a third conductive film on said dielectric film; and

processing said third conductive film into an electrode pattern.

9. A method for manufacturing a semiconductor device according to claim 8 further comprising the step of coating a surface of said second mask layer with a dielectric film.

10. A semiconductor device comprising:

a semiconductor substrate having a source and a drain of a MOS transistor formed therein;

a first insulating film formed on a predetermined region of said semiconductor substrate;

a first conductive film as a gate electrode and a second insulating film formed on a predetermined region of said first insulating film;

a third insulating film, as a side wall insulating film, formed on each of both side faces of said first conductive film and said second insulating film;

a second conductive film connected to one of said source and said drain of said MOS transistor and extending over said gate electrode of said MOS transistor, said second conductive film having a pattern in which said second conductive film is separated into both side portions as to said second insulating film;

a first mask layer formed on a first region of said second conductive film; and

a second mask layer formed on a second region of said second conductive film along each of side faces of said first mask layer.

11. A semiconductor device according to claim 10, wherein said first mask layer is formed of an insulating film, and said second mask layer is formed of a conductive film.

12. A semiconductor device according to claim 10, wherein each of said first and second mask layers is formed of an insulating film.

13. A semiconductor device according to claim 10, wherein said first mask layer is formed of a conductive film, and said second mask layer is formed of an insulating film.

14. A semiconductor device according to claim 10, wherein each of said first and second mask layers is formed of a conductive film.

15. A semiconductor device according to claim 10, further comprising:

an interlayer insulating film formed on said

second insulating film, and said first and second mask layers, a contact hole being formed through both said interlayer insulating film and said first mask layer so as to reach said second conductive film; and

a wiring layer formed on said interlayer insulating film so as to fill in said contact hole, said wiring layer being connected to said second conductive film at the bottom of said contact hole.

16. A semiconductor device according to claim 10, further comprising:

a fourth insulating film formed on said second insulating film, and said first and second mask layers, a contact hole being formed through both said fourth insulating film and said first mask layer so as to reach said second conductive film;

a first electrode formed on said fourth insulating film so as to fill in said contact hole, said first electrode being connected to said second conductive film at the bottom of said contact hole;

a dielectric film with which a surface of said first electrode is coated; and

a second electrode formed on said dielectric film.

17. A semiconductor device comprising:

a semiconductor substrate having a source and a drain of a MOS transistor formed therein;

a first insulating film formed on a predetermined region of said semiconductor substrate;

a first conductive film as a gate electrode and a second insulating film formed on a predetermined region of said first insulating film;

a side wall insulating film formed on each of both side faces of said first conductive film and said second insulating film;

a second conductive film connected to one of said source and said drain of said MOS transistor and extending over said gate electrode of said MOS transistor, said second conductive film having a pattern in which said second conductive film is separated into both side portions as to said second insulating film; and

a mask layer formed on an edge region of said second conductive film.

18. A semiconductor device according to claim 17, wherein said mask layer is formed of a conductive film.

19. A semiconductor device according to claim 17, wherein said mask layer is formed of an insulating film.

20. A semiconductor device according to claim 17, further comprising:

a dielectric film with which at least a surface of said second conductive film is coated; and  
an electrode formed on said dielectric film.